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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,230	11/14/2003	Gauri Sankar Lal	06458 USA	1195

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AIR PRODUCTS AND CHEMICALS, INC.  
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EXAMINER

VOLLANO, JEAN F

ART UNIT PAPER NUMBER

1621

DATE MAILED: 06/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/713,230

**Applicant(s)**

LAL ET AL.

**Examiner**

Jean F. Vollano

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/14/2003</u> . | 6) <input type="checkbox"/> Other: ____  |

### DETAILED ACTION

1. The instant application claims no earlier priorities. Claims 1-21 are pending.

#### *Claim Rejections - 35 USC § 112*

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation of “adding an SF<sub>5</sub> group to a terminal alkene”. The process appears to not only add an SF<sub>5</sub> group but also a bromine. The reaction appears to be an addition reaction across a double bond wherein a SF<sub>5</sub>Br is added to the double bond. Is the claim not claiming that the product has a Br or is the produced compound an intermediate? Is the final product one in which the HBr is then removed to form a compound wherein the final product only has an SF<sub>5</sub>? If this is so some essential steps are missing. If this is not so then the wording is such that the claim is confusing as to what the product of the process is. It is noted that a claim must be written in a clear and concise manner pointing out the metes and bounds of what is being claimed as the instant invention. The same problem exists in claim 6.

Claim 1 recites the limitation of “effecting reacting of said terminal alkene”. It is unclear what is meant by “effecting”. Does this mean that the temperature is effected? If the reaction is just that reacting said terminal alkene with SF<sub>5</sub>Br under liquid phase conditions then that should be clearly stated. If that is not the case the term effecting is making the claim vague and indefinite as to what is meant by effecting. Also the term under “liquid phase conditions” is confusing.

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Does that mean that any solids must be melted to form a liquid phase before reacting with another liquid ? Or does this mean that when the reactants mixed together must all be liquid as in dissolution of any solid. The terminology of “liquid phase conditions” is confusing as to what is being claimed. Does this condition require a certain temperature etc? It seems dependent claim 30 allows a temperature of from  $-90^{\circ}\text{C}$  and that would make some olefins (example styrene which is being claimed in claim 2 and melts at  $-30^{\circ}\text{C}$  a solid. The  $\text{SF}_5\text{Br}$  is a gas) solids at that temperature and therefore adds to the confusion of the phrase. The same problem exists in claim 6.

Claim 4 recites the limitation of “an amount of from 1-25%”. There is no indication of what the amount is referenced to. Is it 1-25% relative to the alkene? Is it 1 to 25% relative to the  $\text{SF}_5\text{Br}$ ? Or is the relationship to the total composition?. Also is it 1-25 molar % or 1-25 volume % or 1-25 wt %. The claim is confusing as to the metes and bounds that are being claimed.

Claim 9 has an e.g. which means for example. It is unclear if this is a limitation or if it is just description of what is meant by slight excess. If it is a limitation perhaps it would be clearer if presented in a dependent claim.

Claim 16 recites a “composition represented by the structures.” These are compounds not compositions. Is applicant claiming compounds or is the compound part of a composition? If so what else is in the composition? Is it a mixture of the compounds? There is an or between the compounds not an “and” . The claim is confusing as to what is exactly being claimed. Is the compound not being claimed? The same problem occurs in claims 17-21.

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2. There would seem to be a rejection at first glance of claims 1-13 under 35 U.S.C. 103(a) as being unpatentable over Ayt-Mohand et al (Organic Letters –2002-PTO 1449) in view of Winter et al ( Journal of Organic Chemistry 1994). The rejection would seem to be as follows-

Ayt-Mohand et al teaches a process for the preparation of SF<sub>5</sub> halogen compounds by reacting a SF<sub>5</sub>halogen with an olefin which can be terminal or non terminal to product the saturated product in a liquid phase reaction (see whole page 3014).

Ayt-Mohand et al teaches the process can proceed by either photochemical reactions or by free radical initiation using triethyl borane at a temperature of –30<sup>0</sup>C (see reaction in table 1 on page 3014).

Ayt-Mohand et al differs in that the reactant is SF<sub>5</sub>Cl and not SF<sub>5</sub>Br.

Winter et al teaches that SF<sub>5</sub>Cl and SF<sub>5</sub>Br can be added across double bonds and the same compound being made by Ayt-Mohand in table 1 wherein R<sub>1</sub> is H, R<sub>2</sub> is OAc, R<sub>3</sub> is H. Although this compound is not being specifically made in the instant invention Winter by making it with SF<sub>5</sub>Cl and SF<sub>5</sub>Br shows that there is an equivalence between the two groups. Having this knowledge and having the rest of the compounds being given in table 1, it would have been obvious to have used the bromo analogue for the reaction with an expectation of success for addition over the double bonds. It also would have been obvious to have optimized the ratios of reactants in a known reaction to optimize the yield.

Having stated this the examiner notes that the bromo compounds that are being made are not known ( the OAcBr is not being made in the instant invention) therefore no motivation to make the compounds except for one that is known SF<sub>5</sub>CH<sub>2</sub>CH<sub>2</sub>Br and not being claimed in the composition section of the instant invention . However this particular compound is prepared

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according to CA:107:23824 in a gaseous phase by reacting ethane with SF<sub>5</sub>Br in a gaseous phase (not liquid) by reacting at various temperatures for 3 days- it is really a side product in a polymerization . It is also noted that Ayt-Mohand does not purport to make this compound as the SF<sub>5</sub>CH<sub>2</sub>CH<sub>2</sub>Cl . A text entitled Chemistry of Hypervalent compounds 1999 ( submitted by Applicant on the PTO 1449) states on page 298 that “SF<sub>5</sub>Br adds in some cases when SF<sub>5</sub>Cl fails , although there are also reposted cases where SF<sub>5</sub>Br fails and SF<sub>5</sub>Cl adds successfully.” This shows that even though for one reaction there appears to be an equivalence for another it may not be there so there is no predictable equivalence and without that predictability the equivalence is more in the “obvious to try” arena than “obvious” . It is also noted that all of the references cited by the examiner or applicant that use SF<sub>5</sub>Br usually have electronegative groups attached to the olefin which is not the case with SF<sub>5</sub>Cl. This chemistry is not the straight forward organic chemistry that is known to one of ordinary skill in the art. The SF<sub>5</sub>Cl is not organic. Therefore although the possible rejection was started by the examiner,for reasons above it was not made.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Winter et in Journal of Fluorine Chemistry 1994 teaches a process for the preparation of SF<sub>5</sub>CH<sub>2</sub>CHBr(OAc) by reacting a terminal olefin with SF<sub>5</sub>Br under liquid phase conditions at a temperature of room temp However the R' is precluded from being a O-C=O-CH<sub>3</sub> (OAc) group.

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US 3,284,496 teaches the preparation of  $\text{SF}_5\text{CHBrCHBrCl}$  but the halogenated compounds are not included and the process is not the same.

Winter in Journal of Fluorine Chemistry 2000 teaches the addition of  $\text{SF}_5\text{Br}$  to acrylic esters which are not being claimed in the instant process but the process is the same.

Nixon et al in the Journal of Fluorine Chemistry 1998 teaches the process of preparing pentafluoro sulfonyl terminal groups which also contain a Br group by addition of  $\text{SF}_5\text{Br}$  to dienes. However the dienes in being prepared do not contain halogenated groups on the double bonds.

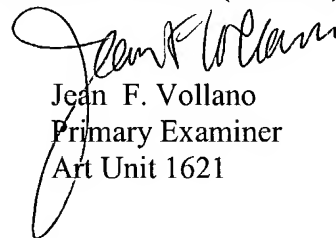
Winter et al in the Journal of Fluorine Chemistry 2003 teaches the addition of  $\text{SF}_5\text{Br}$  to olefins that have benzene rings as an R group but the olefinic portion has halogens attached.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean F. Vollano whose telephone number is 571-2720648. The examiner can normally be reached on Monday-Thursday 6:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272- 0646. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jean F. Vollano  
Primary Examiner  
Art Unit 1621

June 6, 2004